

Water Quality Modeling Issues in the Delta & San Francisco Bay

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Water Quality v. Chemical Constituent Modeling
Biological - Water Quality Impacts

Toxics

Metals - Copper SF Bay
Pesticides - Diazinon

Nutrients

N & P - Impact on Domestic Water Supplies and Fishery Resources
Sediment Toxicity and Water Quality

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ABSTRACT

The Sacramento - San Joaquin River Delta is experiencing serious water quality degradation problems due to the input of chemical constituents upstream and within the Delta. At this time, the load response relationships for these various constituents - problems are poorly understood. A review is presented of some of the Delta-related water quality problems that need attention. These include the diazinon toxic pulses that pass through the Delta each year. The issue in this case is the water quality significance to beneficial uses of Delta waters of the diazinon-caused toxicity to zooplankton and the significance of zooplankton death for a several week period each spring on the fish and aquatic life-related designated beneficial uses of Delta waters.

Another important issue is the excessive fertilization of Delta waters by nitrogen and phosphorus compounds from the Delta watershed that cause excessive fertility in water supply reservoirs that store Delta waters. This excessive fertility significantly degrades the raw water quality for municipalities that use Delta waters as a water supply. There is need to develop load response models that can be used to reliably assess the potential impact of controlling nitrogen and/or phosphorus inputs to the Delta on domestic water supply water quality.

The relative significance of in-Delta vs. specific Delta watershed sources of dissolved organic carbon as a precursor for trihalomethanes should be determined. Of particular importance is the relative significance of various types of DOC sources. It may be possible through an understanding of the loads from various types of sources of DOC to develop load response models to relate the impact of controlling DOC from a particular source on THM formation for water utilities that use Delta water as a raw water source.

A discussion will also be presented on the importance of focusing so-called water quality models on true water quality issues. At this time, so-called water quality models are typically chemical constituent models that do not reliably assess water quality impacts. True water quality models must incorporate the biological responses as the output from the model.

Water Quality Modeling: What It Is & What It Is Not

Water Quality

Is Not a List of the Concentrations of Chemical Constituents
in a Water

Is Character Relative to Designated Beneficial Uses of Water

For Chemical Constituent to Impact Aquatic Life - Water Quality,
It Must Significantly Adversely Impact Numbers, Types, and
Characteristics of Desirable Aquatic Organisms

For Most Chemical Constituents, Cannot Use Total Concentration
to Evaluate Impact of Chemical Constituent on Water Quality -
Beneficial Uses

Chemical Constituents Exist in Aquatic Systems in Variety of
Chemical Forms, Only Some of Which Are Toxic - Available

Most So-Called "Water Quality Models" Are Really "Chemical
Constituent Models," i.e., Predict Concentrations of Chemicals
Constituents at Some Location and Time

True *Water Quality Model* Predicts Impact of Chemical
Constituents on the Numbers, Types & Characteristics of
Aquatic Organisms or Other Beneficial Uses of a Water

Must Incorporate Aquatic Chemistry & Aquatic Toxicology of
Chemical Constituents to Develop Real Water Quality Models